Plan Ceibal

Public Pricing Tender 2020
PHYSICOCHEMICAL SENSORS

Digital Labs

I+D+i

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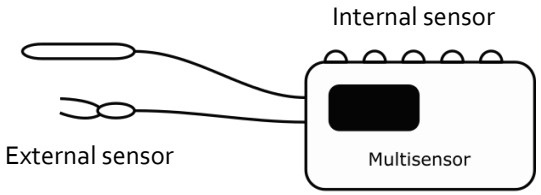
1. BACKGROUND

Since 2011, Centro Ceibal has made physicochemical sensors available to Primary Education, Secondary Education and Education Training Centers with the purpose of addressing new didactic challenges by promoting learning and the application of scientific methodology. Through the collection and analysis of experimental data, these sensors constitute important tools for innovation and development of educational projects.

2. CALL AIM

The aim of this Bidding Document is to acquire multisensors and their corresponding data collection and analysis software compatible with Plan Ceibal equipment (ANNEX V- Equipment specifications).

The product consists of a physicochemical multisensor ("all in one") that acts as an autonomous data logger, which incorporates different types of sensors, and which also admits the connection of external sensors.



The target audience is second cycle primary school students and teachers (4th, 5th and 6th year) and middle school students from UTU and Secondary subsystems. The age ranges from 9 to 16 years are contemplated.

The equipment will be used in educational centers by teachers and students, which is why the search is directed to intuitive operating equipment. Likewise, the equipment must be robust and resistant, guaranteeing proper functioning inside and outside the classroom.

Its application and use will be for educational purposes that allow evidence of theoretical concepts, so that the student can obtain their own records of practical experiences when using the sensors inside and outside the classroom.

The main objective of the devices is to promote learning processes related mainly in the area of science, in students of Primary and Secondary Education of our Public Educational System.

3. REQUIREMENTS

The requirements of the educational multisensor products to be purchased are detailed below.

3.1 MANDATORY REQUIREMENTS

3.1.1 Mandatory Requirements of Hardware

The multisensor is required to present the sensors detailed in TABLE I.

The measurement ranges and sample rates indicated are reference values to guide the selection of sensors to offer; Different ranges of operation will be studied during the evaluation.

The sampling rates are expressed in samples per second (sps).

TABLE I: Mandatory requirements: *Type of sensors*

#	Type of sensor	Units, ranges and maximum sampling rate	Specificities	Mandatory external accessories
1	pH	0 to 14	Pre-calibrated Allows calibration before use	Storage buffer solution in instructions
2	External temperature probe	ºC and K -25 ºC to 125 ºC 100 sps	Pre-calibrated Waterproof	Not required
3	Voltaje	± 25 V 20.000 sps	Pre-calibrated	Cables with banana connectors
4	Electricity	±1 A 20,000 sps	Pre-calibrated	Cables with banana connectors
5	Air pressure (barometric)	0 to 300 kPa 10 sps	Pre-calibrated	Plastic Tube
6	RH	0 to 100% RH 100 sps	Pre-calibrated	Not required
7	Light (light level)	0 to 55,000 Lx	Pre-calibrated	Not required
8	Sound (sound level)	10 to 100 dB[SPL] with A-weighted (required)	Pre-calibrated	Not required
9	Distance	0.4 to 10 m 10 sps	Pre-calibrated	

In addition, other mandatory hardware and software requirements detailed below in TABLE II must be met.

TABLE II: Mandatory Requirements of Hardware: Performance Specifications	
#	**Characteristic**
1	It must allow scheduling, storing (recording) and configuring experiments (sensors, sampling rate or frequency).
2	It must have the capacity to store data obtained autonomously (which has an internal memory).
3	It must have a built-in display for instant viewing of selected sensors and language and registry setup menu
4	The recorded data must be expressed in units of the International System of Units (SI).
5	It must support simultaneity of sensor use: the equipment must be able to record simultaneous measurements of any subset of at least 3 of the mandatory sensors installed.
6	Connectivity with laptops to export the data obtained with the hardware (USB, Bluetooth, WIFI among others)
7	Power based on built-in rechargeable battery. A full battery charge must support 24 hours of continuous operation (measurements).
8	The connection to the electrical network of the equipment or its chargers must comply with the following: the plug must be of type CEE 7/16, with 2 cylindrical legs with insulation; power is nominal 230V, 50Hz.
9	The equipment must comply with standards applicable to information technology equipment such as UL1950 / IEC950 / EN60950. The safety regulations must be declared in the offer.

3.1.2 Mandatory Requirements of Software

The software associated with the device is a tool for the representation and visualization of the data registered and obtained by the sensors found in the hardware. It allows to visualize and recognize the sensors that are selected in the hardware, expanding the possibilities of working in the classroom with this technology.

The software associated with the hardware allows the different behaviors of the variables to be studied with the device to be analyzed using graphs and tables.

The communication of the software with the hardware broadens the possibilities of use and application of the device in learning processes from the different subjects of the curriculum. Strengthens the interpretation of data and the correct presentation of experimental results that guides the scientific methodology.

The following functionalities are valid both for experiments communicated from the multisensor hardware, as well as for the study and visualization of previously saved experiments. The characteristics and mandatory requirements of the measurement visualization, analysis and recording software are detailed below.

TABLE III: ***Mandatory Requirements of Software***	
#	**Characteristic**
1	The software must be compatible with Ubuntu and / or Android operating systems for laptops and tablets respectively, distributed by Plan Ceibal (see Annex V).
2	The software must be free to download and use, without requiring extra costs or licensing procedures for the user and have a clear explanation of the download and installation procedure.
3	It must allow the download of the records obtained and the export of the data (that is, the set of measurements of all sensors and their corresponding time stamps) in standard open formats. The CSV format is considered mandatory.
4	User interfaces must be able to be configured in Spanish language.
5	The software must be usable without an internet connection: the usage and viewing functions listed below must not require an internet connection. This is without prejudice to the fact that other extra functionalities do require connection (for example, functions to share experiments or generate reports).
6	The recorded data must be expressed in units of the International System of Units (SI).
7	The sensors used must be detected automatically.
8	Graphical representation of data: it must be possible to select the sensors to represent graphically, as well as the time intervals to be displayed.
9	Numerical representation of data: It should be possible to view the sensor records in a tabular way.

3.2 OPTIONAL REQUIREMENTS

The optional hardware requirements and availability of these sensors and features will demonstrate the expandability and additional facilities of the multi-sensor base product.

3.2.1 Optional Requirements of Hardware

Table IV indicates additional sensors to those of the mandatory base product.

TABLE IV: ***Optional Requirements of Hardware: Type of sensors***

#	Type of Sensor	Units, Ranges, Max Rate Of sampling	Specificities	Mandatory external accessories
1	Geolocation	1 sps	Measurement of latitude, longitude, altitude, date and time, speed and route.	Not required
2	Gaseous oxygen	0 to 25%, 100 sps	Pre-calibrated	Calibration solution and sensor fill solution (1 M KCl) and replacement membrane.
3	Carbon dioxide gas	0 to 10.000 ppm, 100 sps	Pre-calibrado	Co2 probe attached to the sensor body by rubber coated cable. Glass bottle and / or container that accompanies the design of the sensor to carry out the experiments.
4	Dissolved oxygen	0 to 15 (mg/L), 100 sps 0 to 125 %, 100 sps	Pre-calibrated	DO (Dissolved Oxygen) calibration solution and fill the DO (Dissolved Oxygen) sensor (1 M KCl) and replacement membrane.
5	Turbidity	0 to 200 NTU, 100 sps	Pre-calibrated	Cells or cuvettes for correct measurement in the sensor cell.

6	Force (dynamometer)	± 50 N 100 sps	Pre-calibrated	Mechanisms (hooks, press, clips) to attach to supports and objects to be tested.
7	Photogate	10,000 sps	Pre-calibrated Infrared transmitter and receiver located in photogate	Measurement cards. Fixing device that allows attachment to supports or other laboratory material.
8	UVA radiation	0 to 65000 mW/m2 100 sps	Pre-calibrated	
9	UVB radiation	0 to 1,500 mW/m2 aprox 290 to 320 nm 100 sps	Pre-calibrated	
10	Magnetic field	± 10mT 3.000 sps	Pre-calibrated	
11	Rotational motion: angle, angular velocity, and angular acceleration	Degrees (°): 0 to 360 Radians per second (rad/s): ±345 Radians per second squared (rad / s2): ± 32, 222 Revolutions per second (rev / s): ± 55, 100 (S / sec)	Pre-calibrated	
12	Electrical conductivity of liquids	Three types of records: µS / cm - microsiemens - per centimeter - mg / L - ppm Operating range: 0 to 20.00 µS / cm 100 sps	Pre-calibrated Carbon graphite parallel electrodes	
13	Anemometer	0 to 120 km/h 10 sps	Pre-calibrated	
14	Dissolved carbon dioxide	0 to 15 mg/L CO_2 Medium temperature range 0 to 60°C	Pre-calibrated	Fill and calibration solutions if applicable.
15	Nitrate	0.1 to 14,000 mg/L 0.1 to 14,000 ppm	Pre-calibrated	Calibration and storage

		1 M to 7x10-6 M 100 sps		solution

4. OFFER

The offer must be submitted according to the specifications detailed in this section. Centro Ceibal reserves the right to reject an offer that does not respect the mandatory specifications.

The offer must be expressed according to the Price Quote table in Annex I, and indicate compliance with the mandatory and optional requirements requested in section 2 and 3 using the tables in Annex II.

Likewise, along with the offer, the following must be submitted:

- **Sample** of the multisensors offered to carry out measurement tests and evaluate performance (1 per model) with their respective external sensors (thermocouple, electrodes, photogate, etc.). Samples of both mandatory and optional sensors are required, according to section 4.1.
- Access to measurement and graphics **software**
- **Technical documentation** containing sensor specifications and detailed characteristics as mandatory and optional requirements, specified in 4.2.
- **Economic offer** through the listing table of Annex I according to 4.3 and Tables of compliance with mandatory and optional requirements of Annex II.
- **Background Information** as an educational provider according to 4.4

4.1 SAMPLE OF OFFERED SENSORS

- A sample of the complete product offered must be presented to carry out data record tests in practical experiences related to the curriculum of our public of the educational system (Primary and Middle) and evaluate the correct operation and accuracy of the values obtained by each sensor. Sensors or optional features that do not present samples will not be evaluated.
- If the sensors require calibration or storage solutions (pH, chloride, nitrate, dissolved oxygen, dissolved carbon dioxide, conductivity, etc.), a sample of these solutions and a technical specification of the composition of that solution and / or buffer must be available.
- Some tests to be carried out with the samples could result in total or partial destruction, or alter the conditions with respect to which they were delivered. Those samples that are not damaged may be returned in different conditions with respect to which they were delivered.

- The bidder will have 4 weeks from the award to collect the submitted samples. Once the previous term has expired without the total of the samples of the products offered being withdrawn, Centro Ceibal will be able to freely dispose of them, without the right to claim on the part of the bidder.
- In exceptional cases and when there are justified reasons in Ceibal's judgment, the bidder may defer delivery for a reasonable period that Ceibal will evaluate.

4.2 TECHNICAL DOCUMENTATION REQUIRED

At least the following information must be specified and included in the offer, and may also accompany brochures and manuals, physical and / or digital, with additional information.

- Hardware user manual with technical specifications and use or operation guide (in physical or digital medium)
- Specific calibration manual for those sensors that require calibration prior to use. This should include manual or instructions for the preparation of the storage buffer solution and calibration for the pH sensor, dissolved oxygen, dissolved carbon dioxide, nitrate, chloride and all those that require it.
- Examples of experiences or educational practices that can be carried out with the sensors offered are requested.

4.3 ECONOMIC OFFER

The offer must specify the CIF Montevideo unit price for each product offered, according to the following volume bands:

Ranges/Quantities	**Multisensors Quantities**
Offer Range 1:	*1 to 50 Multisensors*
Offer Range 2:	*51 to 100 Multisensors*
Offer Range 3:	*101 to 200 Multisensors*
Offer Range 4:	*201 to 300 Multisensors*
Offer Range 5:	*301 to 400 Multisensors*
Offer Range 6:	*More than 401 Multisensors*

Quotes must be submitted by completing the PRICE QUOTE TABLE in ANNEX I.

The quotation of the mandatory sensors must be made in the PRICE QUOTE TABLE A including the mandatory sensors that are not considered in the multisensor and are external. The included multisensors (both mandatory and non-mandatory but cannot be separated from the multisensor) must be specified in the comment box.

The optional sensors must be priced in the PRICE QUOTE TABLE B respecting the volume ranges. The discounts considered by a bundle of different sensors must be specified in the comments box (for example: 10 + 20 + 15 + 30).

4.4 Background Information

The bidder must also present background information as a supplier:

- Folder with specification of factory background, the factory that will produce the devices offered must be detailed.
- Folder with background of educational projects in which he has participated.

5. DELIVERY PERIODS

The bidder must specify the delivery period for the products, to be met as of the award notification. A delivery period of less than 60 calendar days after the award is expected for a minimum of 60 units and the remaining no later than 90 days.

In case of not being able to comply with the aforementioned deadlines, the bidder must specify the delivery deadlines in his offer.

Centro Ceibal may request to adjust the arrival schedule with the awarded supplier.

6. WARRANTY

The bidder must include in his proposal the conditions, procedures and deadlines for executing warranty claims. The bidder will guarantee that the products supplied under the contract are new, complete, unused and free from defects attributable to design, materials, manufacturing, storage conditions (packaging, appropriate temperature and humidity), shipment or any other act or omission of the bidder that could manifest itself on the occasion of the normal use of the products under the prevailing conditions in the country.

The warranty period for the product must be informed by the bidder, with a minimum warranty period of 1 year. In the event that the guarantee period is not specified, Centro Ceibal will consider a guarantee period of at least one year.

7. SENSORS EVALUATION

The evaluation consists of a technical evaluation and an economic evaluation, which will be weighted according to the following technical-economic formula:

Aspects to be evaluated	**Weight**
Technical offer	70%
Price	30%

In the **economic evaluation**, only the cost associated with mandatory requirements will be considered.

In the **technical evaluation**, compliance with all the mandatory requirements is verified, and an additional limited score (15 points out of 100) is reserved to contemplate the possibility of expansion and additional facilities of the multisensor base product.

The technical evaluation will try to assess the adequacy of the sensors to the operating environment to which they will be exposed and to the work dynamics to be achieved in educational centers. They are categorized by weighting percentages defined according to their relevance to Plan Ceibal, according to the expected learning objectives.

In the evaluation stage, Ceibal may also request a demonstration of the products from the bidder.

Therefore, in the evaluation, divide the total of 100 points as follows:

Technical Evaluation - 70%

1. Adaptation to the educational environment - 20%
    - usability
    - adaptation to both teaching audience and students
    - activity guide or educational support materials specific to the device
2. technical characteristics of the Hardware - 15%
    - autonomy (battery life, portability)
    - robustness (IP, resistance to dust, water etc)
    - recording capacity and sampling memory
    - precision and accuracy of the measurements recorded by the sensors
    - sensor calibration appropriate to the educational environment
3. Software - 20%
    - communication with hardware
    - usability
    - data analysis tools
    - display of measurements in real time
4. Assessment of the possibility of expansion and additional facilities of the multisensor base product - 15%

Economic Evaluation- 30%

5. Economic Valuation - 30%

8. ANNEX I – PRICE QUOTE TABLES

Unit prices in USD - CIF Montevideo

Quote the mandatory sensors as a single multi sensor and according to the ranges.

PRICE QUOTE TABLE A (Unit prices USD- CIF MVDO.)		
MANDATORY		
Physicochemical multisensor *(including mandatory sensors external to the multisensory)*	**Multisensor + mandatory sensor model/s** *(not included in multisensor)*	**Delivery period**
Offer Range 1 1 to 50 Multisensors		
Offer Range 2: 51 to 100 Multisensors		
Offer Range 3: 101 to 200 Multisensors		
Offer Range 4: 201 to 300 Multisensors		
Offer Range 5: 301 to 400 Multisensors		
Offer Range 6: 401 or more Multisensors		
Comments		
Sensors included in multisensor		

- In all cases, the delivery period must be specified for each item according to each range in case of variation.

Unit prices in USD - CIF Montevideo

Quote the optional sensors each one separately and according to the ranges.

PRICE QUOTE TABLE A (Unit prices USD- CIF MVDO.)		
OPTIONAL		
Optional sensors	**Sensor/s**	**Delivery period**
Offer Range 1 1 a 50 Multisensors	Model A . . . Model N	
Offer Range 2: 51 to 100 Multisensors		
Offer Range 3: 101 to 200 Multisensors		
Offer Range 4: 201 to 300 Multisensors		
Offer Range 5: 301 to 400 Multisensors		
Offer Range 6: 401 or more Multisensors		
Comments		

- For optional sensors, if there is a discount for a bundle of different sensors (e.g. 10 + 20 + 15 + 30), please specify in the comments box.

9. ANNEX II – COMPLIANCE TABLES

The bidder must complete the compliance tables for all the requested requirements. For reference to the evaluation team, you must also indicate in which part of the submitted offer the information corresponding to the requirement is found in the Observations field.

The column COMPLIANCE with the mandatory requirements will be completed with the options Yes / No. In the case of the options, it can be completed with the options Yes / No / Partial. In the event of partial compliance, the information is included in the OBSERVATIONS column.

TABLE I: ***Mandatory Requirements of Hardware: Type of sensors***

#	Type of sensors	Units, ranges and maximum sampling rate	Specificities	Mandatory external accessories	COMPLIANCE YES / NO	OBSERVATIONS
1	pH	0 to 14	Pre-calibrated Allows calibration before use	Storage buffer solution		
2	External temperature probe	ºC and K -25 ºC to 125 ºC 100 sps	Pre-calibrated Waterproof	Not required		
3	Voltage	± 25 V 20.000 sps	Pre-calibrated	Cables with banana connectors		
4	Electricity	±1 A 20,000 sps	Pre-calibrated	Cables with banana connectors		
5	Air pressure (barometric)	0 to 300 kPa 10 sps	Pre-calibrated	Plastic Tube		
6	RH	0 to 100% RH 100 sps	Pre-calibrated	Not required		
7	Light (light level)	0 to 55,000 Lx	Pre-calibrated	Not required		
8	Sound (sound level)	10 to 100 dB[SPL] with A-weighted (required)	Pre-calibrated	Not required		
9	Distance	0.4 to 10 m 10 sps	Pre-calibrated			

TABLE II: Mandatory Requirements of Hardware: Performance Specifications			
#	**Characteristic**	**COMPLIANCE YES / NO**	**OBSERVATIONS**
1	It must allow scheduling, storing (recording) and configuring experiments (sensors, sampling rate or frequency).		
2	It must have the capacity to store data obtained autonomously (which has an internal memory).		
3	It must have a built-in display for instant viewing of selected sensors and language and registry setup menu		
4	The recorded data must be expressed in units of the International System of Units (SI).		
5	It must support simultaneity of sensor use: the equipment must be able to record simultaneous measurements of any subset of at least 3 of the mandatory sensors installed.		
6	Connectivity with laptops to export the data obtained with the hardware (USB, Bluetooth, WIFI among others)		
7	Power based on built-in rechargeable battery. A full battery charge must support 24 hours of continuous operation (measurements).		
8	The connection to the electrical network of the equipment or its chargers must comply with the following: the plug must be of type CEE 7/16, with 2 cylindrical legs with insulation; power is nominal 230V, 50Hz.		
9	The equipment must comply with standards applicable to information technology equipment such as UL1950 / IEC950 / EN60950. The safety regulations must be declared in the offer.		

TABLE III: ***Mandatory Requirements of Software***			
#	**Characteristic**	**Compliance YES / NO**	**Observations**
1	The software must be compatible with Ubuntu and / or Android operating systems for laptops and tablets respectively, distributed by Plan Ceibal (see Annex V).		
2	The software must be free to download and use, without requiring extra costs or licensing procedures for the user and have a clear explanation of the download and installation procedure.		
3	It must allow the download of the records obtained and the export of the data (that is, the set of measurements of all sensors and their corresponding time stamps) in standard open formats. The CSV format is considered mandatory.		
4	User interfaces must be able to be configured in Spanish language.		
5	The software must be usable without an internet connection: the usage and viewing functions listed below must not require an internet connection. This is without prejudice to the fact that other extra functionalities do require connection (for example, functions to share experiments or generate reports).		
6	The recorded data must be expressed in units of the International System of Units (SI).		
7	The sensors used must be detected automatically.		
8	Graphical representation of data: it must be possible to select the sensors to represent graphically, as well as the time intervals to be displayed.		
9	Numerical representation of data: It should be possible to view the sensor records in a tabular way.		

TABLE IV: *Optional Requirements of Hardware: Type of sensors*						
#	**Type of Sensor**	**Units, Ranges, Max Rate Of sampling**	**Specificities**	**Mandatory external accessories**	**Compliance YES / NO**	**Observations**
1	Geolocation	1 sps	Measurement of latitude, longitude, altitude, date and time, speed and route.	Not required		
2	Gaseous oxygen	0 to 25%, 100 sps	Pre-calibrated	Calibration solution and sensor fill solution (1 M KCl) and replacement membrane.		
3	Carbon dioxide gas	0 to 10.000 ppm, 100 sps	Pre-calibrated	Co2 probe attached to the sensor body by rubber coated cable. Glass bottle and / or container that accompanies the design of the sensor to carry out the experiments.		
4	Dissolved oxygen	0 to 15 (mg/L), 100 sps 0 to 125 %, 100 sps	Pre-calibrated	DO (Dissolved Oxygen) calibration solution and fill the DO (Dissolved Oxygen) sensor (1 M KCl) and replacement membrane.		
5	Turbidity	0 to 200 NTU, 100 sps	Pre-calibrated	Cells or cuvettes for correct measurement in the sensor cell.		
6	Force (dynamometer)	± 50 N		Force (dynamometer)		
7	Photogate	10,000 sps	Pre-calibrated Infrared transmitter and receiver located in photogate	Measurement cards. Fixing device that allows attachment to supports or other laboratory material.		
8	UVA radiation	0 to 65000 mW/m2 100 sps	Pre-calibrated			
9	UVB radiation	0 to 1,500 mW/m2 aprox 290 to 320 nm 100 sps	Pre-calibrated			
10	Magnetic field	± 10mT 3.000 sps	Pre-calibrated			
11	Rotational motion: angle, angular velocity, and angular acceleration	Degrees (°): 0 to 360 Radians per second (rad/s): ±345 Radians per second squared (rad / s2): ± 32, 222 Revolutions per second (rev /	Pre-calibrated			

		s): ± 55, 100 (S / sec)				
12	Electrical conductivity of liquids	Three types of records: µS / cm - microsiemens - per centimeter - mg / L - ppm Operating range: 0 to 20.00 µS / cm 100 sps	Pre-calibrated Carbon graphite parallel electrodes			
13	Anemometer	0 to 120 km/h 10 sps	Pre-calibrated			
14	Dissolved carbon dioxide	0 to 15 mg/L CO_2 Medium temperature range 0 to 60ºC	Pre-calibrated	Fill and calibration solutions if applicable.		
15	Nitrate	0.1 to 14,000 mg/L 0.1 to 14,000 ppm 1 M to 7x10-6 M 100 sps	Pre-calibrated	Calibration and storage solution		
16	OTHERS					

10. ANNEX V – DEVICE SPECIFICATIONS

10.1 Laptop SF20GM3 (Sirio)

10.1.1 Hardware

- CPU: Intel® Celeron® N4000 @ 1.10 GHz Dual Core
- Video card: the devices do not have one, what they have is a GPU that is in conjunction with the CPU (in the links of the specifications you can find more information).
- RAM: 4GB LPDDR4
- Memory: eMMC Sandisk SDINADF4-64GB
- Audio
    - Audio subsystem
    - Amplifier and internal speakers
    - Built-in microphone
    - Connector for microphone and external speakers
- Screen: LCD LED 11.6"TN (Non Touch)
- Resolution: 1366 x 768
- Integrated color video camera
- 1280 x 720 HD Web Camera
- Wireless Connectivity: Intel 9461NGW
- Bluetooth: Version 4.0
- Expansion Ports
    - 1 x Mini DC-in jack
    - 1 x USB 2.0 port
    - 1 x USB 3.0 port
    - 1 x HDMI
    - 1 x microphone/headphone combo
- Keyboard: QWERTY in Spanish
- Touchpad
- Energy specifications
    - Voltage: 7,6 VDC
    - Battery: 4000 mAh
    - Autonomy: 5 hours approximately

10.1.2 Software

- Operating Systems
    - Windows 10
    - Ubuntu 18.04.3
- Version:
    - Sirio_db_e14 (Windows)
    - Sirio_db_e14 (Ubuntu)
- User: ceibal
- Password: ceibal
- BIOS Version: 1.0.0.CEI
- Total disk space: 64 GB
- Free space: 27 GB

10.2 Laptop SF20PA3 (model 2019)

10.2.1 Hardware

- CPU: Intel® Celeron® N3350 @ 1.1 GHz Dual Core
- Video card: the devices do not have one, what they have is a GPU that is in conjunction with the CPU (in the links of the specifications you can find more information).RAM: 2GB DDR3L
- Memory: eMMC Sandisk SDINADF4-32G
- Audio
    - Audio subsystem
    - Amplifier and internal speakers
    - Built-in microphone
    - Connector for microphone and external speakers
- Screen: LCD LED 11.6"TN (Non Touch)
- Resolution: 1366 x 768
- Integrated color video camera1280 x 720 HD Web Camera
- Wireless Connectivity: Intel® Dual Band Wireless-AC 3165 802.11ac
- Bluetooth: Version 4.0
- Expansion Ports
    - 1 x Mini DC-in jack
    - 1 x USB 2.0 port
    - 1 x USB 3.0 port
    - 1 x HDMI
    - 1 x combo microphone/headphone
- Keyboard: QWERTY in Spanish
- Touchpad
- Energy Specifications
    - Voltage: 7,4 VDC
    - Battery: 4000 mAh
    - Autonomy: 5 hours approximately

10.2.2 Software

- Operating System: Ubuntu 18.04
- Version: Ubuntu_e33
- Graphical environment: Gnome FlashBack 3.18
- User: ceibal
- Password: ceibal
- BIOS Version: 2.00.02.CB x64
- Total disk space: 32 GB
- Free space: 13 GB

10.3 Tablet Ceilab 2018, 2019, 2020

10.3.1 Hardware

- Measures: 255 x 155 x 9.5 mm
- Resolution: 1280 x 800 IPS, TFT 16M color display

- Features: Capacitive, 10-point multitouch
    - Network card
    - 802.11 b/g/n
- Processor
    - Brand: Chipset
    - Model: MT8127
    - Architecture: ARM Cortex-A7
    - Frequency: 1.3 GHz
    - No. Of physical cores: 4
    - RAM Memory: 1 GB (LPDDR3)
- Internal Storage
    - 8 GB
    - Free space in disk
    - 2.83 GB
    - Integrated microphone: Yes
    - Integrated Speakers: Yes
    - Supported audio formats: aac, amr, awb mp3, ogg, wav
    - Headphone output: Yes, 3.5mm
    - Rear camera: Yes, 2 Mpxl
    - Front camera: Yes, from VGA
- Camera
    - Sensor, zoom and video
    - With FF
    - HDR format selection
    - Digital zoom
- Video
    - Supported formats: DivX, XviD, MPEG4, VP8, H.263, H.264
    - Resolution: 720p @ 10fps for VGA and 1080p @ 15fps for 2M FF
- Ports
    - SD card reader: Yes (micro SDC up to 64GB)

- Connectivity
    - Bluetooth: Yes, BT4.0
    - GPS: Yes
    - OTG: Yes
    - Wifi: Yes, 802.11 b/g/n

- Battery and charger

    - Battery: 4060 mAh (4.5 hours of charge)
    - Charger: Europlug connector (CEE 7/16)
    - Charger connector: Micro USB (5 V / 2 A, UC13, black)

10.3.2. Software

Operating System

- Android 5.0.1
- Free space available for the user
    - 2.8 GB
    - PAM / 1.5.94
    - DragonBox +12 / 2.2.0
    - Updater / 1.85
    - My Books (ex Book Reader) / 1.7
    - Kidbox PDF Reader / 1.16

https://www.ceibal.edu.uy/es/dispositivos/tablets